APPENDIX B

MARKED-UP VERSION OF SUBSTITUTE SPECIFICATION

(42 pages)

Marked-up draft

System and method for real-time bidding for Internet advertising space

Cross Reference to Related Application:

[0001]   This application is a continuation-in-part of ~~co-pending~~ U.S. patent application serial number 08/787,979, now U.S. patent number 6,285,987, entitled "Internet Advertising System", having a filing date of Jan. 22, 1997.

Field of the Invention:

[0002]   The present invention relates to computer networks and more particularly to a system and method for selecting and then presenting advertisements on the screens of computers that are connected to the Internet.

Background of the Invention:

[0003]   Many web sites on the Internet World Wide Web regularly display advertisements. The particular advertisement that is displayed when a viewer accesses a web site can either be stored locally on the web site or it can be stored on a central server. As used herein the term viewer refers to an individual who views or looks at a web page using a program such as one of the commercially available web browsers.

[0004]   The Hyper Text Transfer Protocol (HTTP) and the Hyper Text Mark Up Language (HTML) provide a mechanism whereby one website can easily link to a remote server. The HTTP mechanisms for referencing and obtaining material from a remote server is useful in providing advertising material for display to viewers. There are commercially available systems that provide advertising material for web sites from a central server. Various web pages have links to this central server. With such an arrangement, when a viewer accesses a particular web page, a central server provides an advertisement that the viewer seeks on the web page.

[0005]   Using standard HTTP facilities it is possible to track when a particular viewer accesses a web site and thus it is possible to compile a data base which in essence provides a

profile of the sites a particular viewer has accessed using the same browser. Furthermore it is known that types of viewers generally access particular categories of web sites. The capabilities inherent in the World Wide Web for tracking the sites that a viewer has seen provides a mechanism for targeting particular advertisements to particular types of viewers.

[0006]   There are prior art systems that provide advertisements from a central server that has a database of information on viewers. A database of viewer information can be compiled from a variety of sources including information about a viewer that is available when a viewer accesses a server. In such prior art systems, the characteristics of the viewer as provided by the data base of viewer information determines the particular advertisement which is displayed when a particular viewer who accesses a web site. Other information such as the characteristics of the web site can also be used to determine which advertisement a viewer will see when a web site is accessed. Using such systems advertisers can target advertisements by criteria such as web site category, geographic location of the viewer, the operating system of the viewer's computer, the type of browser which the viewer is using, the internet domain type of the viewer, etc.

[0007]   Advertisers who use such prior art systems must specify in advance, the targeting criteria they want to use for their advertisements. The central server the provides advertisements to viewers based upon: (a) the targeting criteria established by the advertisers, (b) the information which the central server has in its data base concerning the particular viewer; (c) information about the web site that has been accessed by the viewer, and (d) other information available to the central server such as the time of the day.

Summary of the Present Invention:

[0008]   An object of the present invention is to provide a computer system and a method implemented in a computer system for determining in response to each advertising opportunity of a plurality of advertising opportunities, which advertisement of a plurality of advertisements to provide for fulfilling the advertising opportunity. Each advertising opportunity is an opportunity to serve an advertisement to a browser in response to a request for content by the browser.

[0009] The computer system may store a plurality of sets of bidding parameters. Each set of bidding parameters is associated with one or more of the plurality of advertisements and an advertiser. Each set of bidding parameters is indicative of whether the associated advertiser is desirous that a bid should be submitted for providing one of the associated one or more of the plurality of advertisements for fulfilling the advertising opportunity.

[0010] The computer system may receive an indication of a request for content, thereby presenting an advertising opportunity. In response to the request for content, one or more bids are submitted in the computer system, each submitted bid being based on one of the sets of bidding parameters that are met by characteristics of the advertising opportunity. Each submitted bid, in accordance with the one of the sets of bidding parameters, is associated with a monetary amount payable by the advertiser associated with the each submitted bid if the each submitted bid is selected and a specific event occurs. The computer system includes programming code for submitting bids, for selecting a bid from among the submitted bids and for identifying an advertisement associated with the selected bid.

[0011] Various other novel aspects and objects of the present invention will be inherent from the entirety of the disclosure of this specification and its appended claims.

Brief Overview of the Invention and Some of its Embodiments

[0012] The present invention provides an improved method and system for providing advertisements from a central server to viewers who access web sites. In one embodiment a ~~With the present invention the~~ central server system stores both advertisements, which are to be displayed, and an information database. The database includes information about viewers, information about the characteristics of particular web sites and other information relevant to which advertisements should be displayed for particular viewers. In contrast to the prior art systems, the present invention evaluates, in real time, bids submitted by different advertisers in order to determine which particular advertisement will be displayed to a viewer.

[0013] The fact that a viewer has accessed a web page which has an HTML reference to the advertising server ~~of the present invention~~, is herein referred to as a view opportunity or view-op. The characteristics of each view-op include the characteristics of the particular web

site and web page being accessed and the characteristics of the viewer including demographic information about the viewer and information as to what other sites this viewer has accessed in various periods of time.

[0014] ~~With the present invention each~~ Each advertiser provides one or more "proposed bids" which specify how much the advertiser is willing to pay for displaying a particular advertisement in response to a view-op with certain characteristics. Each proposed bid can specify a price or amount that the advertiser is willing to pay for the opportunity to display an advertisement (a) to a viewer who has a particular set of characteristics and (b) on a web site and web page that meets a particular set of criteria. Each proposed bid can be dependent upon or require satisfaction of various criteria which must be met in order for a bid of a particular amount to be submitted. For example an advertiser might specify that the first one thousand times that view-ops meeting certain criteria occurs, a bid of five cents will be submitted and each time thereafter that a view-op meeting the criteria occurs a bid of one cent will be submitted. The amount bid for a view-op can be dependent on as many criteria as the advertiser cares to specify. Another example is that an advertiser might bid ten cents if the view-op was by a viewer who had recently visited a particular web page and one cent for the same view-op if the viewer had not recently visited the particular web page. Yet another example of a parameter which could be specified in a proposed bid is the "click-through" rate for the particular site where the view-op originated. The click-through rate is the rate at which viewers click on an advertisement to access the advertiser's web site. Thus, the bidding parameters can either be simple or complex.

[0015] One embodiment of the ~~The~~ present invention includes (a) a web server system which has data bases stored therein, (b) bidding agents which compare the characteristics of view-ops to the specifications in proposed bids and which submit bids as appropriate, and (c) bid selection logic which decides which bid to accept for each particular view-op.

[0016] When a view-op arises, the bidding agents evaluate the characteristics of the view-op compared to the specifications in proposed bids and the bidding agents submit bids to the bid selection logic where appropriate. Next, the bid selection logic selects the highest bid from the various available bids and the advertisement which is specified in the highest bid is

displayed. A novel aspect of the present invention is the organization, operation and interaction between the bidding agents, the server which provides information to the bidding agents, the bid selection logic and the associated mechanisms for presenting the advertisements.

[0017]   In one embodiment A further aspect of the present invention is an additional parameter that is taken into account for determining whether to display an advertisement corresponding to the highest bid. When a view-op occurs which meets the specifications in a proposed bid, the view-op is further evaluated in terms of the comparative effectiveness of the particular advertisement on each of the sites on which the advertisement was previously displayed. The frequency of the advertisement is increased on sites that have proved effective and decreased on sites that have a lower effectiveness. Thus an additional parameter is considered and evaluated on a real time basis to determine if a particular advertisement should be displayed in response to a particular view-op. This additional parameter takes into consideration the effectiveness of this particular advertisement on the sites where it was previously displayed.

[0018]   The present invention provides a very flexible system whereby advertisers can minimize cost and maximize effectiveness while the owner of web sites can obtain the highest possible revenue for displaying advertisements on their site.

Brief Description of the Drawings:

[0019]   Figure 1 is a simplified system block diagram of a standard preferred embodiment of the invention.

[0020]   Figures 2A and 2B are simplified block flow diagrams of the operation of the standard preferred embodiment.

[0021]   Figure 3 is an overall block diagram of the standard preferred embodiment of the invention.

[0022]   Figure 4 is a diagram showing the organization of various tables, which are utilized by the standard preferred embodiment of the present invention.

[0023]   Figures 5A to 5C are flow diagrams showing how each view-op is evaluated or tested in the standard preferred embodiment of the invention to determine if a bid should be submitted.

[0024]   Figures 6A to 6E are flow diagrams showing the operation of the system in the standard preferred embodiment.

[0025]   Figure 7A and 7B are flow diagrams of the enhanced embodiment.

[0026]   Figure 8 is a block diagram of an alternate embodiment of the invention.

Detailed Description of the Embodiments of the Invention:

[0027]   A standard preferred embodiment is shown in an overall simplified diagram in Figure 1, and a simplified block diagram of the operations of the system is shown in Figures 2A and 2B. After the principles of the standard preferred embodiment has been explained with reference to Figures 1 and 2, the standard preferred embodiment is described with reference to Figures 3 to 6. The standard preferred embodiment is equivalent to the system shown an described in co-pending patent application serial number 08/787,979 now US Patent number 6,285,987, filed 1/22/97 and entitled "Internet Advertising System", which is assigned to the same assignee as is the present application. The above referenced application is hereby incorporated herein by reference in its entirety.

[0028]   As shown in Figure 1 a human viewer 10 utilizes a client web browser 11 to access a web page 12 on a web site 14. The web page 12 is transmitted to browser 11 in a conventional manner. Web page 12 includes an HTML reference to a file (i. e. an advertisement) located on an advertising web server system 16. The client web browser 11 has what is known in the art as a "cookie" 11A , which provides information from browser 11 to the web server system 16. The client web browser 11, the cookie 11A, the web site 14 and the web page 12 are all conventional and in widespread use. For example, the client web browser 11 could be one of the commercially available web browsers, for example, the commercially available and widely used web browser marketed by Netscape Communications Corp. under the trademark "Netscape Navigator" or the browser marketed by Microsoft Corporation under the trademark "Internet Explorer". The web site 14 and the web page 12

could be any of the thousands of web sites and web pages which are part of the World Wide Web and which have HTML references to advertisements which are located on a remote server.

[0029]   Web page 12 includes an HTML reference to an advertisement stored on advertising web server system 16. Each time client web browser 11 displays web page 12, the human viewer 10 will see an advertisement which is provided by advertising web server system 16. Such HTML references are in widespread use and they are implemented using conventional HTML tags. Advertising web server system 16 includes a database of advertisements 16A, a database of viewer information 16B, and bid selection logic 16C. The bid selection logic 16C receives bids from bidding agents 30A to 30Z which in turn receive information concerning proposed bids from bid input system 18. For purposes of illustration only three identical bidding agents 30A, 30B and 30Z are specifically shown. The reference number 30 will be used to refer to a typical bidding agent. It should be understood that the system could include any number of bidding agents. For example, a system could include several thousand bidding agents 30. Bid input system 18 provides bidding agents 30 with proposed bids which specify how much should be bid for view-ops with particular characteristics. Each bidding agents 30 evaluates each view-op to determine if the view-op meets the criteria specified in a particular proposed bid and if so how much should be bid.

[0030]   Each bidding agent 30 evaluates a view-op with respect to one proposed bid to determine if a bid should be submitted. Each proposed bid includes a list of parameters that specify the particular type of viewer that the advertiser wants to reach. For example, a proposed bid might specify that the advertiser is willing to pay five cents for the opportunity to place an advertisement on a web page which is accessed by a viewer who has accessed three financial web pages and an automotive web page within the last week.

[0031]   In general the system includes one bidding agent 30 for each proposed (see later discussion about multi-level bids). Each advertiser would have an associated bidding agent 30 for each ad campaign the advertiser wants to conduct. Advertisers submit proposed bids to their associated bidding agents for evaluation against view-ops. Bidding agents 30 can be

simple or complex and if desired they can have the ability to evaluate more than one proposed bid to determine which bid should be submitted to the bid selection logic 16C.

[0032]   When a view-op presents itself (i.e. when viewer 10 accesses a web page 11 which contains an HTML reference to server system 16) the advertising web server system 16 performs four operations:

(1) It updates the information about the viewer that is in database 16B.

(2) It sends information concerning the view-op to the bidding agents 30. The information sent includes information that the server system 16 received from browser 11 and information in databases 16B. Bidding agents 30 in turn decide which bids to submit to bid selection logic 16C.

(3) It compares various bids received from bidding agents 30 in order to determine which advertisement to display.

(4) It sends the appropriate advertisement from data base 16A to browser 11.

[0033]   The operations performed by advertising web server system 16 are shown in Figures 2A and 2B. Figure 2A shows how server system 16 uses the information from cookie 11A to update the database of viewer information 16B to reflect the fact that this particular viewer has accessed this particular web page. The operations proceed as shown by blocks 201 to 203. Block 201 indicates that a viewer has selected web page 12 and that the selected web page has been transmitted to the viewer's browser 11. As indicated by block 202, web page 12 has an HTML reference to a file on server system 16 using conventional HTML techniques. Block 203 indicates that the server 16 then obtains data from cookie 11A to update the database of viewer information 16B.

[0034]   When a viewer 10 accesses web page 12, which has an HTML reference to server system 16, the system determines which advertisement from database 16A to present to the viewer. The manner in which the system performs these operations is shown by block diagram 2B. For example, one advertiser might have submitted a proposed bid to bidding agent 30A which specified that he is willing to pay five cents for displaying an ad to a viewer

who has accessed at least three financially oriented web sites within the last week. Another advertiser might have submitted a proposed bid to bidding agent 30B specifying that he is willing to pay six cents for displaying an advertisement to a viewer that has accessed at least three financially oriented web sites within the last five days. When a view-op occurs which is initiated by a viewer 10 who has accessed three financially oriented web sites in the last five days, bidding agents 30A and 30B would determine that the particular view-op satisfies the criteria specified by both advertisers. Both bids would be submitted to bid selection logic 16C and bid selection logic 16C would then select the highest bid, and the advertisement specified by that advertiser would be displayed to the viewer. The criteria specified by the advertisers may be much more complex and involve many more parameters than those given in the simple example specified above. However, notwithstanding the complexity of the proposed bids and the number of parameters specified in each proposed bid, the basic operations performed by bidding agents 30 and by bid selection logic 16C are as illustrated in the above simple example.

[0035]   As shown in Figure 2B, a cycle of operation begins (block 210) when a viewer 10 selects a web page 12 which has a HTML reference to web server system 16, that is, when a view-op occurs. It is noted that this occurs in real time and it can take place thousands of times per minute. Block 211 indicates that the web server system 16 sends information concerning the view-op and related information in the data base 16B to the bidding agents 30. The bidding agents 30 compare the information about the view-op to the proposed bids that have been submitted by advertisers. That is, the bidding agents 30 determine if the characteristics of the view-op meet the criteria in the proposed bids and if so they submit bids to bid selection logic 16C (block 213). As shown by block 214, the bid selection logic 16C compares various bids and selects the highest bid and therefore an advertisement for display. The appropriate advertisement called for by the winning bid is then sent from database 16A to browser 11 (block 215).

[0036]   Block 212 indicates that each advertiser submits proposed bids. Each bid includes various parameters that, for example, specify the type of web page on which the advertiser wants to advertise and an amount, (i.e. the dollar amount) which the advertiser is willing to pay for having a particular advertisement displayed.

[0037] In order to understand the power of the system shown in Figures 1 and 2, it is important to realize that the bidding agents 30 evaluate proposed bids in microseconds, that is, in real time. The rate at which "hits" on web pages occur (i.e. the rate at which viewers access web pages that have HTML reference to server system 16) can be in the order of thousands per second. Thus, the evaluation of proposed bids is performed very quickly in real time. Proposed bids can contain parameters which specify that a proposed bid will in effect change in real time. For example a proposed bid might specify that for the first 1000 matching view-ops, the proposed bid will be five cents and for the next 1000 matching view-ops the proposed bid will be four cents. The actual submission of proposed bids by advertisers and the rate at which advertisers can change their proposed bids is measured in minutes compared to the rate at which the system evaluates proposed bids which is in the order of microseconds.

[0038] The operation of the browser 11, the operation of the web server 14, and the manner in which web pages produce HTML references to web server system 16 using the HTTP protocol and HTML mark up language are described in numerous published books such as "HTML Source Book A Complete Guide to HTML" by IAN S. Graham, published by John Wiley and Sons (ISBN 0 471-11849-4) or "The Internet Complete Reference" by Harley Hahn and Rick Stout, published by Osborne McGraw-Hill, ISBN 0 07-881980-6. Numerous other books are also available which describe the HTTP protocol. Such books describe how a browser, such as 11, can access a web page, such as web page 12, which in turn has an HTML reference to a file (i.e. an advertisement) stored on a server such as advertising server system 16.

[0039] A more detailed block diagram of the standard preferred embodiment of the invention is shown in Figure 3. Numerous additions and changes can be made to the standard preferred embodiment shown in Figure 3 without departing from the spirit of the invention. As will be explained later with reference to Figure 8, a number of systems, each identical to the system shown in Figure 3, (and each of which is at a different geographic location) can be interconnected into a network so as to more efficiently service view-op requests.

[0040] As shown in Figure 3, the standard preferred embodiment is composed of five main units, namely, web server 310, view server 320 (servers 310 and 320 together comprise

the advertising web server system 16 shown in Figure 1), identical bidding agents 30A, 30B and 30Z, bid input server 18 and log and billing unit 320A. As stated with respect to Figure 1, a system can include any number of bidding agents. A typical system could include a thousand or more bidding agents. For clarity of illustration only three bidding agents 30A, 30B and 30Z are specifically shown in Figure 3. Hereinafter the term bidding agent 30 will refer to one representative bidding agent. It should be understood that there could be many bidding agents 30 in a system.

[0041]   Bidding agents 30 evaluate bids to determine if a particular view-op meets the criteria of a particular bid. That is, bidding agents 30 compare the specifications in a proposed bid to the characteristics of a view-op. An example of the comparison process is explained later with reference to Figure 5. Bid selection logic 16C in view server 320 determines which advertisement will be displayed, that is, which is the highest bid for each particular view-op.

[0042]   The web client browser 11 accesses web sites (such as site 14) using the conventional HTTP protocol. The present invention begins to function when the web page which is accessed by browser 11 contains a conventional Internet HTML reference to web server 310.

[0043]   The web server 310 provides an advertisement to web client browser 11 in response to an HTML reference. Such an operation is conventional. The function of the present invention is to determine which particular advertisement from data base 16A will be provided in response to each HTML reference from web client browser 11 to web server 310.

[0044]   The web server 310, view server 320, bidding agents 30 and bid input server 18 can all be implemented by computer programs that are all resident in and executed by one single physical computer. Alternatively, each of the components may be implemented in separate physical computers connected by a conventional inter-computer network. The decision concerning implementation in a single computer or in a group of interconnected computers depends upon the cost, capacity and speed of the available computers. With respect to the explanation of the operation of the present embodiment, it is not relevant as to whether or not the various components are implemented in a single computer or in a network of interconnected computers.

[0045] The web server 310 can be implemented using conventional commercially available web server technology. For example, the commercially available web server marketed under the tradename Zeus can be used to implement web server 310. The operating system used in web server 310 is conventional and is not described herein. It could for example be the conventional Unix operating system. Likewise view server 320 and bid input server 18 have a conventional operating system such as the Unix operating system. The processes and programs described herein run as application programs under such a conventional and commercially available operating system.

[0046] When web server 310 receives an HTTP request or HTML reference (a view-op), it delivers the contents of the view-op to the view server 320. View server 320 in turn sends information concerning the view-op to bidding agents 30. Bidding agents 30 in turn evaluate the characteristics of the view-op (which includes information supplied by server 320) against the criteria specified in each proposed bid. If the characteristics of a view-op meet the criteria in a proposed bid, a bidding agent 30 will submit a bid to view server 320. After receiving input from bidding agents 30 (that is from all the bidding agents 30 that submit bids) the bid selection logic 16C in view server 320 selects the highest bid and indicates to web server 310 which advertisement should be displayed in response to the view-op. In response to the input from view server 320, the web server 310 delivers the appropriate advertisement to the web client 11.

[0047] Bidding agents 30 must be programmed to evaluate proposed bids in a certain amount of time and to submit actual bids to server 320 within preestablished time limits. If server 320 does not receive a bid from a particular bidding agent 30 within a certain time, it assumes that it will not receive a bid from that bidding agent and it selects the highest bid from the bids received from the other bidding agents.

[0048] The main functionality or the "kernel" of the system is implemented in the view server 320 and in bidding agents 30. View server 320 has a number of tables, and conventional data base functionality for querying, inserting, updating and deleting data from the tables. The data base capabilities may be implemented using a conventional commercially available Structured Query Language (SQL) data base such as one of the data bases marketed

by Oracle Corp. or the data base marketed by Microsoft Corp. under the tradename "Access". Alternatively, these tables can be implemented using specially written programming which optimizes the speed of certain operations.

[0049]   View server 320 and bidding agents 30 are each objects (in the CORBA or Common Object Request Broker Request sense), they are persistent, and they can be moved across machine or network boundaries. Naturally performance is impacted depending upon whether or not these objects are implemented in one computer or in a network of connected computers. As is conventional, indexing techniques can be used in order to increase speed of operation related to the various tables.

[0050]   The following terms are used herein with the following meaning:

[0051]   Ad-Serve: Placing or "pumping" advertising content in an HTTP reply to a view-op. Note, putting advertising content in an HTTP reply results in an advertisement being displayed by a browser so that it can be seen by a Viewer.

[0052]   Ad-Script: A script or mark up language for establishing bidding logic.

[0053]   Bidding Agent: A unit, computer program or agent (in the programming sense) that evaluates the characteristics of a view-op to determine if the criteria or parameters set out in a particular proposed bid meets the specifications of a particular view-op.

[0054]   Click-through: The event that occurs when a Viewer clicks on an advertisement and is hyperlinked to new content.

[0055]   Exposure: The number of ad serves for a particular advertisement.

[0056]   Frequency: Number of times each viewer (on average) will be exposed to an advertisement. In general the frequency is equal to the total number of exposures divided by the reach number.

[0057]   I/CODE: A standard identifier assigned to individual viewers. I/Codes are used as registration information by many web sites. Interact Profiles Corporation offers a commercial service which collects in-depth demographic information about viewers for

whom it issues or assigns I/Codes. This information or other similar information about viewers is stored in table 16B.

[0058] Internet: The global information system that is logically linked together by a globally unique address space based on the Internet Protocol (IP). The Internet is able to support communications using the Transmission Control Protocol/Internet Protocol (TCP/IP) suite.

[0059] IP Data: Data about the viewer which is specified using the Internet protocol. The IP data about a viewer is presented to the system at view-op time in accordance with standard HTTP conventions. The IP data is defined by standard HTTP conventions and it includes: CGI (common graphic interface) variables, Browser type (e.g. Netscape), viewers URL, high-level domain (.edu, .gov, .com, OS of viewer (MAC, Windows, etc.), host, IP address, and URL of referring Web page.

[0060] Maximum Bid Price: This is the maximum amount that can be specified when placing bids on behalf of a bidding agent. (see Minimize Bid).

[0061] Minimize Bid: This is an option that the media buyer (i.e. the person who buys the advertising) can set on or off (it is set for each media buy). If the option is set "on" then the system will try to bid the minimum amount necessary to maintain the level of buying that will ensure the desired number of impressions during the time allotted to the media buy. The amount bid will be increased as need to maintain the desired level of buying; however, it will never be increased beyond the maximum bid.

[0062] Pre-buy: The purchase of the right to display an advertisement in response to particular view-ops for a specified amount.

[0063] Proposed Bid: This is an offer to pay a particular amount for the opportunity to provide an advertisement in response to a view-op that has certain characteristics. If a view op satisfies the criteria specified in a proposed bid an actual bid (called a bid) is submitted to the bid selection logic 16C.

[0064]   Reach: The total number of unique viewers the advertiser wants to reach with the media buy. Cannot exceed the total number of exposures.

[0065]   Recently Seen Ad Data: Information relating to the most recent advertisements served to a unique or particular viewer.

[0066]   Snot Buy: A decision to purchase a particular view-op for a specified amount which is made in real time.

[0067]   View-op: The opportunity to serve an advertisement to a viewer that occurs when a web browser makes a request for content by referencing to a server. This is the basic unit of "perishable inventory" that advertisers buy.

[0068]   View-time: The length of time that a viewer looks at an advertisement.

[0069]   Viewer: A person who accesses a page on a web site and receives an Ad-Serve.

[0070]   Viewer History Data: Historical data about a unique or particular viewer. This may include such information as previous viewing habits, purchases, click-throughs, etc.

[0071]   Viewer Registration Data: Data collected by a web site (at viewer registration time) including age, sex, income, etc. The uploading of this data to the server data base is performed in non-real-time.

[0072]   Web Avail: Sellers inventory, that is, a slot for advertising content. "Avail" is an advertising term. Web avail is the equivalent term applied to the world wide web.

[0073]   Web Page Data: Data concerning a web page such as: keywords, stock categorizations. Also includes (non-real time) third party-supplied data, as well as data provided by the system operator with respect to traffic, pricing, etc. concerning a particular site.

[0074]   Web Site Demographic Data: This is data about a specific web site.

[0075]   Web Site: A term conventionally used in connection with the World Wide Web. Usually an Ad space provider (seller).

[0076]   The system utilizes a number of data tables 16B which are stored in the view server 320 The structure of tables 16B are shown in normalized form in Figure 4. The system also utilizes an area of memory for temporarily storing certain information. This area of memory is called the VOD area of memory. It should be understood, that as is conventional, some of the data in the tables 16B can be stored in program structures and indexes which can then be used to access the data in order to increase speed. For best performance all of the tables 16B must be located in RAM.

[0077]   As shown in Figure 4, there are four tables referred to as HVD, SOD, CVD, AAD and one special area of memory referred to as VOD. The four tables and the special area of memory are:

[0078]   HVD table 408: This table stores Historic Viewer Data. It indicates which sites each viewer has previously accessed.

[0079]   SOD table 409: This table identifies the previously "sold" view-ops. This table tells who previously bought which view-ops.

[0080]   CVD table 410: This table identifies viewers and their characteristics.

[0081]   AAD table 412: This table identifies every active advertiser. There is a record in this table for every active advertiser.

[0082]   VOD area of memory 415: This area temporarily holds data which is being transferred to the bidding agents.

[0083]   A conventional notation system is used to identify fields herein. Substructures of a main structure are designated by using the name of the main structure, followed by a period, followed by the name of the substructure. For example CVD.LTS means the LTS field of the CVD table.

[0084]   The fields in the tables shown in Figure 4 are identified using the following abbreviations:

[0085] HVD table 408 (Historic Viewer Data, which sites each viewer has previously accessed)

1) WS Web Site ID Site where ad was placed

2) SP Site Page ID Page where ad was placed

3) CV Current Viewer ID, this is, who saw the particular web site, the I/Code.

4) TI Time Interval

5) N Number of time the viewer CV visited the site in the time interval TI

[0086] SOD table 409: (who previously bought which view-ops)

1) AA An identification of the bidding agent who purchased a view-op.

2) PP Purchase Price for this view-op

3) CV Current Viewer ID I/Code of who saw the ad

4) WS Web Site ID where ad was placed

5) SP Site Page ID where ad was placed

6) TS TimeStamp when placed

7) AC Agent Content ID of ad that was placed

8) AJ Agent Jump ID of where click-throughs go

9) TSC TimeStamp when click-through happened, (0 for none)

10) VO View-op ID each view-op has a unique ID.

[0087] CVD table 410 (viewers and their characteristics)

1) LTS Last Seen Time Stamp, that is, time this viewer was last seen by the system

2) IP Internet Protocol address (from REMOTE_HOST)

3) DN Domain name Full Domain name (from REMOTE_ADDR)

4) CO Cookie

5) EA Email Address

6) BT Browser

7) CV I/CODE data

8) ZC Zipcode,

9) PDC Parsed Domain Items 1.sup.st level, 2.sup.nd level, 3.sup.rd level parse domain items

[0088] AAD Table 412 (identifies active advertisers)

1) BL Budget Left Current agent's budget remaining

2) CTL Click Thrus Left Current click-through count remaining (number)

3) VL Views Left Current exposure count remaining (number)

4) TE Time Expired Time expired (i.e. agent is "dead" or expired if not 0)

5) AA An identification of the bidding agent

[0089] VOD memory area 415: This is a data communication structure in memory that facilitates passing data between objects. When a view-op is received, data is placed in the VOD area and then transmitted to the bidding agents. As an example, the following data can be placed in the VOD for transmission to the bidding agents.

[0090] Current Viewer Data

CO Cookie--gives information about the viewer that initiated the view-op.

EA Email Addr. of viewer that initiated the view-op.

C I/Code of viewer that initiated the view-op.

TS TimeStamp

LTS Last Seen Time Stamp

IP Internet Protocol information

DN Full Domain Name (e.g. "sales.gm.uk")

PDC Parsed Domain Name (e.g. Top="uk", 2.sup.nd ="gm", 3.sup.rd ="sales")

I/CODE plus associated data

ZC Zipcode*

BT Browser type (e.g. "Mozilla/Unix 4.0")

VO View Op ID

CT Content Type, Identifies a particular type of ad that site will accept.

[0091] Data About Advertisers

Original and Current budget

Original and Current Views budget

Original and Current Click thru budget

Time-Start/End

advertiser ID

[0092] Site Data

Keywords which appear on site

Site Page Ad Minimum Price

Accepts content List (what will site accept e.g. java, gif; sizes)

Site Owner Name

Site URL

Site Title

Site Intra Page Title

[0093] Historic and other data from data base 16B: This is the VODX area 415A: This is a subset of the VOD structure and it is a subset of data that is in the CVD, AAD, HVD and SOD. The data in the VODX is transmitted to the bidding agents on each view-op. The data placed in the VODX can for example be:

   a) CVD Record Portions: Portions of CVD that exist such as domain, browser, I/code relative to a viewer associated with a view-op.

   b) 100 SOD records where SOD.WS.SP=VOD.WS.SP That is, where site page and web site in SOD equal site page and web site in the VOD.

   c) 100 SOD records where Customer ID (i.e. I/Code) in SOD equals Customer ID in VOD That is, sold view-op records for this Viewer.

   d) 100 HVD records: most recent records for this CV, WS and SP.

[0094] In the above example, the historical data is in units of one hundred records. It should be understood that the number of historical records sent to the bidding agents, is established by determining the type of specification which advertisers want to put in proposed bids. If advertisers want to base the decision on whether or not to submit an actual bid on the data in more than 100 historical records, the number of historical records placed in the VOD must be larger than 100. Alternatively, in a low cost system which has a limited amount of memory, and relatively slow speed communication, the data selected for inclusion in the VOD could be less than the data listed above.

[0095] The data in the VOD is provided to the bidding agent 30 at every view-op. The bidding agents 30 can use this information to make a buy decision by comparing the criteria specified in a proposed bid with the characteristics of a view-op. All of the data that is listed above will not be available for each view-op. If certain data (i.e. data in a particular field) is not available relative to a particular view-op and a proposed bid requires that the data in the particular field have a particular value, no actual bid will be submitted by the bidding agent when the proposed bid is evaluated. The list of information or data in the VOD as given above is illustrative and any available information which advertisers feel is relevant to making buy decisions can be provided.

[0096] Some of the data in tables 16B is collected as the system operates. Other information such as information about viewers can be purchased from commercial information providers and periodically inserted into the tables 16B from an external connection.

[0097] On each view-op, that is, when each view-op occurs, bidding information is presented to each of the bidding agents 30. When a bidding agent 30 receives information about a view-op, it evaluates the view op with respect to the criteria specified in a particular proposed bid and the bidding agent then either does nothing or returns to server 320 a bid with a price and an identification of an ad to display if the bid is accepted. When a bidding agent receives information about a view-op each bidding agent 30 performs comparison operations such as those shown in block diagram form in Figure 5.

[0098] The bidding agents may be computer programs written in conventional computer languages. For example a bidding agent 30 may be a program in interpreted form, in script language (for evaluating proposed bids that are in Ad Script form) or a bidding agent may be a previously compiled program. The exact form of the bidding agents is not particularly relevant to the present invention provided that the bidding agent perform comparison operations such as those shown in Figure 5. It is also noted that the bidding agents may be complex computer programs that perform various complex comparison operations in addition to or in place of the operations shown in Figure 5. However, in the standard preferred

embodiment of the invention, the bidding agents are simple conventional computer programs that perform the type of comparison operations shown in Figure 5.

[0099]   During the normal operation of the system, the process begins upon receipt of a view-op from the browser 11. Upon receipt of a view-op the system does the following:

[00100]   1) An attempt is made to identify the viewer via HTTP connect information. The system seeks to determine if this viewer has been seen before. This is done using conventional and well know HTTP protocol techniques, the data in data base 16B and conventional data base technology.

[00101]   2) The data concerning the viewer is used to update the table's Current Viewer Data (table 410) relative to this view-op's viewer.

[00102]   3) A view-op object (VOD 415) is transmitted to each bidding agent 30.

[00103]   4) The bidding agents 30 determine if the view-op meets the requirements of various proposed bids.

[0100]   5) Bids are collected from the bidding agents 30 and a determination is made as to the winning bid.

[0101]   6) The winning bid includes an ad index identifying the ad to be displayed. This ad index which identifies an ad in table 16A is transmitted to the web server 310 and the appropriate ad is sent to the browser 11.

[0102]   7) The tables 16B are updated as to the view-op just bought (as to all view-op data of the just sold item including Historic Viewer Data such as Site, Viewer, Time seeing this exposure, etc.).

[0103]   8) Log and billing information is transmitted to a log and billing unit.

[0104]   Time Path: The following describes the time sequence of operations that occur when a HTTP view-op request arrives from the web server 310. This can be a multi-threaded operation, that is, multiple requests might be processed simultaneously; they each maintain

their own context and depend on the basic operating system (OS) for time slicing. This describes the time sequence for processing one view-op request. The following description uses symbolic values for time.

[0105] Time0:

HTTP view-op request packet received

Extract HTTP variables from HTTP request:

HTTP Query String (PATH_INFO) WS SP

HTTP_VIEWER_AGENT

HTTP_ACCEPT

REMOTE_HOST==domain

REMOTE_ADDR (IP)

REMOTE_VIEWER

REMOTE_IDENT

HTTP_REFER

[0106] Time1:

Lookup in CVD and try to match viewer

If success save CV and update Last Seen TimeStamp

If failure

Create new CV;

insert a new CVD record

[0107] Time 2:

Create & build VOD object (contains view-op data for bidding agents) for the view-op.

[0108] Time 3:

Lookup last N (i.e. 100) SOD records for CV, and save in VOD

[0109] Time 4:

Lookup last N (i.e. 100) HVD records for CV.SW.SP, save in VOD

[0110] Time 5:

Remember VO ID and initiate a time-out.

[0111] Time 6:

Transmit VOD to all bidding agents.

[0112] After the VOD data is transmitted to the bidding agents 30, the bidding agents 30 evaluate proposed bids and if appropriate sent messages (bids) to view server 320. These messages will be bid object data (bid price and ad ID). View server 320 collects the bids and selects the highest bid. (This is done by bid selection logic 16C in view server 320 which compares each bid received with the current winner of the bid compete process until no further bids are received).

[0113] Time 7:

Transmit winning ad index (that is the ad index from the winning bid) to web server 310. The ad-index indicates which of the ads in table 16A is to be transmitted to browser 11.

[0114] Time 8:

Update table 16B (as to the view-op just bought);

[0115] Time 9:

Insert in SOD view-op Data (as to all view-op data of the just sold item);

[0116] Time 10:

Update or Insert Historic Viewer Data (as to Site, Viewer, Time seeing this exposure)

[0117] Time 11:

Transmit Log/Billing information to the Log and billing unit 320A.

[0118] Proposed bids are submitted to bidding agents 30 by bid input unit 18. Each proposed bid, which is submitted in the form of a programming Form Object, contains data fields such as the data fields listed below. A particular proposed bid may not have data in each of the fields of the associated Form Object. Furthermore one proposed bid may contain multiple Form Objects. That is, an advertiser may submit multiple form objects at multiple levels. For example, an advertiser may specify a level one proposal of five cents if one particular set of criteria are met and a level two proposal of four cents if other criteria are met. Each proposed bid (i.e. each form object) may contain a wide range of criteria that must be

satisfied if an actual bid is to be placed. The criteria may be very stringent in a situation where the proposed bid is high and the advertiser wants to reach only a very select group of viewers. On the other hand the criteria may be loose if the bid is low and the advertiser wants to reach a large number of viewers who meet only a minimum set of criteria. For example, a proposed bid might have the single criteria such as that the view-op is from a viewer that is using the "Netscape browser". Alternatively a proposed bid might specify values for items "a", "b", "c", "e", "g", "h" and "i" listed below and specify that these values must be met before a bid is submitted for this advertiser.

[0119]   Another example is that a bid might specify a set of criteria and a list of ads that are to be displayed in sequence each time a particular viewer who meets the criteria is encountered. Such a list is referred to as a "rotation" of ads. A proposed bid might also specify that after all the ads in a rotation are displayed to a viewer, there should be a specified delay before the viewer is again shown the ads in the rotation.

[0120]   As an example, each Form Object may have the following fields (naturally it should be understood that these are merely illustrative and the number and description of actual fields is merely limited by the advertisers desires concerning what criteria the advertiser cares to specify in a proposed bid.):

[0121]   a) Frequency: that is, the number of Ad serves for one unique viewer of this ad
            b) Include sites list (those sites that are acceptable to the advertiser)
            c) Exclude sites list (those sites that are not acceptable to the advertiser)
            d) Maximum bid . . . (in no event can the bid be larger than this amount)
            e) Keywords for site (words that must be in the site if a bid is to be submitted)
            f) Keywords for site-page (words that must be on the page)
            g) Times: Dayparts/Weekparts (when can ad be placed)
            h) Viewer OS (operating system viewer must have)
            i) Viewer Zipcode
            j) Viewer US State
            k) Viewer Domain (.com, .edu, .gov, mil, org)
            l) Viewer ISP

m) Viewer Country

n) Viewer SIC code

o) Viewer # of employees

p) Viewer Annual Revenues.

q) Viewer Browser (what browser viewer must have)

r) Inter-ad Delay (minimum time between placement of ads to a particular viewer)

s) Rotation Delay (delay between placement of ads which are part of a series)

t) List of ads in a rotation . . . (a list of ads that are placed in sequence, see example below)

u) Other (Other criteria that advertiser may care to specify. Naturally, the bidding agent which receives a proposed bid must be programmed to compare the criteria specified in a bid to the data available concerning a view-op)

[0122] Bidding input server 18 includes a conventional data input program that allows entry of proposed bids with fields such as those listed the above. Each proposed bid is transmitted to a bidding agent 30. There is one bidding agent 30 for each proposed bid that is submitted. A system may include thousands of bidding agent programs 30. It should be understood that bidding agents 30 are conventional computer programs that evaluate proposed bids against the characteristics of a view-op to determine if a bid should be submitted to view server 320.

[0123] Bid input system 18 also transmits information to view server 320. For example the budget and identity of each advertiser is transmitted from bid input server 18 to AAD table 412. Entry, transfer and storage of such information is done using conventional data base techniques.

[0124] In the particular embodiment of the invention shown herein, the bidding agent programs 30 perform the operations shown in Figure 5 relative to each level of each proposed bid. As previously indicated each proposed bid may include several bid levels. All of the above elements are repeated in each element. The process shown in Figure 5 is executed for each level of each proposed bid. The Level 0 level is "run" first, the Level 1 next, and so on.

This means that level 0 requirements are evaluated first. If they succeed, the bid is placed as dictated in that level's data. Otherwise Level 1 requirements are checked, and so on. Each level's requirements can be totally independent, but preferably they should get successively less strict, such that the proposed bid value decreases.

[0125] The program shown in Figure 5 is executed for every view-op. It first uses the specifications for Level 0, then on "NEXT," or a failure to meet criteria for a level, it starts over with the next level's criteria. The proposed bid evaluation program shown in Figure 5 performs tests such as the tests shown below upon a proposed bid prior to submitting an actual bid to view server 320. It should be understood that the test below are merely illustrative and any variety of tests can be performed in comparing the characteristics of a view-op with the specifications in a proposed bid. The tests required is limited solely by the desires of the advertiser. Programming for performing such tests and comparisons between specified characteristics of a view-op and specifications in a proposed bid is conventional programming. In the illustration given in Figure 5, the following tests are performed by the bidding agent program.

[0126] Block 501: If Include site List is specified and WS (Web Site ID) is not in Include site List go to DONE, if not go to next test.

[0127] Block 502: If Exclude site List specified and WS (Web Site ID) in Exclude site List go to DONE, if not go to next test.

[0128] Block 503: If Browser specified and no match with Browser being used, go to DONE, if not go to next test.

[0129] Block 504: If MIN site bid <MAX Agent bid go to DONE, if not go to next test (note that a web site can specify a minimum amount (Min site bid) that the site will accept for displaying an advertisement).

[0130] Block 505: If Viewer OS specified and no match go to DONE, if not go to next test.

[0131]   Block 506: If Viewer Zipcode specified and no match go to DONE, if not go to next test

[0132]   Block 507: If Viewer US State specified and no match go to DONE, if not go to next test.

[0133]   Block 508: If Viewer Domain specified and no match go to DONE, if not go to next test

[0134]   Block 509: If Viewer ISP specified and no match go to DONE, if not go to next test.

[0135]   Block 510: If Viewer Country specified and no match go to DONE, if not go to next test.

[0136]   Block 511: If Viewer SIC code specified and no match go to DONE, if not go to next test.

[0137]   Block 512: If Viewer # of employees specified and no match go to DONE, if not go to next test.

[0138]   Block 513: If Viewer Annual Revenues specified and no match go to DONE, if not go to next test.

[0139]   Block 514: If Time List specified and current time not in Time List go to DONE, if not go to next test.

[0140]   Block 515: If Keywords list specified and Keywords not in Site Keywords List go to DONE, if not go to next test.

[0141]   Block 516: If MAX Agent click-through bid specified and MIN site click-through bid then if MIN site click-through bid<MAX Agent click-through bid go to DONE, if not go to next test.

[0142]   Block 517: If No CT (content type) match in Ad list go to DONE, if not go to next test.

[0143]   Block 518: If InterAd Time interval specified then Compute (block 519) (scan for) LastAdViewer for this CV (Last time this viewer saw an ad fulfilled from this agent) from SOD List of 100.

[0144]   Block 520: If InterAd Time Interval and if TimeStamp of LastAdViewer<Inter Ad Time Interval go to done, if not go to next test.

[0145]   Block 521: If Frequency specified perform block 522, that is, Count (scan) SOD per CV for ads sold by this agent. (Block 522A) If this count>Frequency go to DONE, if not go to next test.

[0146]   Block 523 If no LastAdViewer (no record of serving this Viewer) go to done, if not go to next test.

[0147]   Block 523A if InterAdTimeInterval specified then if TimeStamp of Last Ad Serve<Inter Ad Time Interval go to DONE, if not go to next step.

[0148]   Block 524: TRY TO BUY AD with the following steps:

[0149]   Block 525: Select Next Ad to Serve based on CT match, LastAdViewer or Last Ad Served

[0150]   Block 526: Submit BID: Include in the bid submitted to view server 320, the ad ID in the form of an index that can be used by web server 310 to select [a bid] an ad from ad table 16A for display.

[0151]   Block 528: The process is DONE

[0152]   The process that the web server 320 follows when it receives a view-op is shown in Figures 6A to 6E. The process includes the following steps:

[0153]   Begin Process Figure 6A:

[0154]   Block 601: The process begins when the view server 320 receives aViewOpDrive() call. That is when Raw view-op Data is sent to view server 320.

[0155] Block 605: Establish an area in memory for VOD structure (we will write to this area)

[0156] Block 606: Parse the Domain

[0157] Block 607: Parse Accepts (map this to CT)

[0158] Block 608: Parse the Browser field

[0159] Block 609: Write SP, WS, and Cookie to the VOD

[0160] Block 610: Create New view-op record in SOD

[0161] Block 611: Write available information about view-op to new record in SOD

[0162] Block 612: Write TS to SOD

[0163] Block 614: Check to see If Cookie=0 (Is there a Cookie in the request)

[0164] Block 615: If Cookie=0 select on CVD where there is a Cookie match

[0165] Block 616: If Cookie not=0 Select on CVD using other heuristics of viewer

[0166] Block 617: Set (or clear) VOD.CV

[0167] Block 620: check if there is a current viewer.

[0168] Block 621: if CV=0 Insert new viewer in CVD

[0169] Block 623 Insert the new CVD rec. in CVD

[0170] Block 622: Write CVD record to VOD

[0171] Block 630: Select from SOD where CV=VOD.CV for 100 order by TS into VOD and go to next procedure. This selects the 100 most current purchases that were presented to the particular viewer. Write to VOD

[0172] Block 631: Select from HVD where CV,SP,SW all match for 100 most recent records in VOD. Write to VOD

[0173] Block 632: Select from AAD for every active budget. Write to VOD (Write any other data needed by bidding agents to VOD)

[0174] Block 634 Send VOD data to Bidding Agents. Each bidding agent run its logic (see Figure 5)

[0175] Block 635: Bidding agents send result to View Server 320

[0176] (The following is the process where bid selection logic 16C in view server 320 picks the best bid)

[0177] Block 641: Pick maximum bid

[0178] Block 642: Update AAD data

[0179] Block 643 Check for expiration of bidding agent in AAD table

[0180] Block 644: Set VOD info to winner and go to next procedure.

[0181] Block 645: check if CVD exceeds its maximum.

[0182] Block 646 if block 645 answer is yes, Select oldest CVD record, Post it to a CVD archive file

[0183] Block 650: check if CVD>MAXSIZE.

[0184] Block 651: If block 650 answer is yes, Delete oldest CVD record and proceed.

[0185] Block 653: Compose the SOD record from VOD data.

[0186] Block 654: Insert SOD record.

[0187] Block 655: check if count of SOD records>MAXSIZE: if no go to next procedure.

[0188]   Block 656: If block 655 answer is yes, Select oldest SOD record, POST it to an archive file and go to next procedure.

[0189]   Block 660: check if count of SOD records>MAXSIZE, if answer is no, go to next procedure

[0190]   Block 661: If answer to block 660 is yes, delete oldest SOD record.

[0191]   Block 662: Select from HVD for CV, SP, SW, current time interval. That is, select for this current viewer, for this bidding agent, on this web site, for this time interval.

[0192]   Block 663: Write data to VOD and go to next procedure.

[0193]   Block 664, Check if HVD Rec=0 That is, if HVD record was found

[0194]   Block 665, If no HVD record found, Insert New HVD rec.

[0195]   Block 666: If HVD record was found, Update existing HVD rec.

[0196]   Block 670: check if new HVD rec. was inserted and count>MAXSIZE.

[0197]   Block 671: If answer to block 670 is yes, Delete oldest HVD rec.

[0198]   Block 672: Create Accounting Rec. from VOD data.

[0199]   Block 673: POST the data to an archive file

[0200]   Block 674: Post ad info to web server 310. That is, tell web server 310 which ad to display.

[0201]   Block 675: Dequeue, Delete the VOD. This is the end of the procedure. It starts again at the next view-op.

[0202]   The series of steps shown in Figures 6A to 6E are the procedural operation performed by the view server 320. These can be programmed using any of the conventional programming languages such as SQL. The particular computer used to perform the program is of no particular consequence so long as it is fast enough to provide a reasonable degree of

performance. In order to speed the operation of the system if there is a large number of bidding agents 30, the bid selection logic 16C may be implemented using hard wired logical circuitry rather than by utilizing a computer program. The programming or circuitry in bid selection logic 16C is conventional. It merely receives the bids from each of the bidding agents 30 and selects the highest bid and then transfers the ad index for this bid to web server 310 and transfers other information about the bid to the data tables 16B and to log and billing unit 320A.

[0203]   Web Server 310: The web server 310 is a conventional web server which is programmed to provide two main functions:

[0204]   1) Answer and hold the state of each HTTP request; deliver the view-op to the system kernel in view server 320; receive the system kernel reply and deliver the content. This is a multi-task operation. The contents (the IP data) of each view op, along with its type (either a request for content or a click-through) are delivered to the view server 320. This communication is through shared memory or alternatively it may be through a conventional inter-computer network.

[0205]   2) Install and remove Ad content separately, and asynchronously. Service requests to install (store) and remove (delete) ads from data base 16A. On an install, the web server returns a WC, a handle or index to the location of the ad. WCs should be unique for the life of the system. This is done by a conventional data base program.

[0206]   Bid input server 18 is a conventional data base server which accepts information and deliver; it to the tables in view server 320 and to bidding agents 30. Bid input server 18 provides a data input mechanism for the system. Data table 18-T in bid input server 18 stores the identity of each of the advertisers and the particular bidding agents 30 to which bids from that advertiser should be sent. Bidding agents 30 can all be identical or alternatively some may have capability for evaluating more complex criteria in proposed bids. The data table 18T stores information which indicates which bidding agent should receive proposed bids from which advertisers. Bid input Server 18 is a conventional data base input unit.

[0207]   The log and billing unit 320A is a conventional data base program that provides conventional log and billing functions. As concerning users and web sites becomes old and stale, it is transmitted to an archive in log and billing unit 320A. A log of all transactions that takes place in the system is also maintained by unit 320A. This is done using conventional programming techniques.

[0208]   In the figures, only one web browser 11 is shown. It should be understood that web browser 11 is merely representative of the web browsers connected to the Internet world wide web. Web server 310 is connected to the Internet and hence it can receive HTML references from any of the millions of browsers connected to the Internet. Web browser 11 is merely illustrative of one of the browsers connected to the Internet.

[0209]   The specifics of the various data bases, the specifics of the various fields in the data bases, and the specifics of the form used to submit a bid, the parameters that are considered in evaluating bids, as shown herein are illustrative only and various changes in the data bases, the fields and the parameters along with changes in the operation of these details of the system could be made without departing from the spirit and scope of the invention.

[0210]   Specific data can be introduced into data base 16B in a number of ways. Some of the data is collected as previously described as the system operates. Other data can be viewer registration data, that is data obtained when viewer register at related web sites. Likewise viewer history data in data base 16B can be collected as the system operates or it can be purchased from commercial sources and entered into data base 16B as a batch of information. Web site demographic data can be collected from commercially available sources and entered into data base 16D.

[0211]   The specific data collected in data base 16B is determined by the criteria that advertisers want to establish in proposed bids. Data base 16B can store any type of information that advertisers care to specify in proposed bids. Any data that advertisers want to use in setting specifications in proposed bids can be stored in tables 16B using conventional data base technology. This data is transferred to the VOD area of memory and to the bidding agents 30 when a view-op occurs. Bidding agents 30 must be programmed to compare the

data received from the VOD to the specifications in a proposed bid to determine if an actual bid should be submitted.

[0212] It is herein assumed that a viewer always accesses the world wide web using the same browser, so that the cookie in a browser accurately reflects what a viewer has done. It is also assumed that only one viewer uses a particular browser, again so that the cookie in the browser accurately reflects what the particular viewer has done. If different individuals use different sign-on names with the same browser, or if different individuals who use the same browser otherwise identify themselves to the system, they can be assigned separate I/Codes even though they use the same browser.

[0213] It is also noted that a system could combine the operation of the present invention with the operation of the prior art type of system where access to advertising on particular web sites is sold for a specified amount. An operator of the system could sell "pre-buys", that is, access to the view-ops that occur on a particular site and the operator could insure that a particular advertiser always has access to these view-ops as done by the prior art systems. This could be done by merely entering into the system proposed bids with a value that is the maximum allowed by the system for those particular view-ops that are sold as pre-buys.

[0214] An enhanced embodiment of the present invention is shown in Figures 7A and 7B. The enhanced embodiment of the present invention provides an additional parameter that is taken into account in determining whether or not to display an advertisement corresponding to the highest bidder. The additional parameter is based upon the effectiveness of a particular advertisement on a particular web site in comparison to the effectiveness of this same advertisement on the other web sites where it has been displayed. The following highly structured and simplified example illustrates the operation of this additional parameter. The operation in a "real-world" situation will be explained later.

[0215] Consider the following situation: an advertiser wants to have an advertisement displayed 10,000 times per day for a 10 day period (that is, 100,000 time) in response to view-ops that meet certain criteria.

[0216]   For this example assume:

(a) that the advertiser bids ten cents for each of these view-ops.

(b) that view-ops that meet the specifications in the bid are on average occurring on 1000 sites at a rate of 40 view-ops per day per site.

(c) that the view-ops occur evenly spaced during the day and that the view ops occur in an even stream from the sites. That is the view-ops occur in an orderly sequence such as site1, site2, site3......,site 1000, site 1, site2, site3, ...site 1000.

(d) that for the view-ops on 500 of these site, some other advertiser has a higher bid.

[0217]   Thus there will be 500 sites, each receiving 40 view-ops per day which fit the ad's criteria and where this advertiser's bid is the highest bid.

[0218]   With the standard preferred embodiment, the advertisement would be displayed 20 times per day on each of the 500 sites. That is, the advertisement would be displayed 50 percent of the times that view-ops meeting the criteria occur. By displaying the ad 50% of the time that appropriate view-ops are presented the advertising campaign lasts ten days in accordance with the original specifications provided by the advertiser.

[0219]   Note: 20 view-ops per day _times_ 500 sites _times_ 10 days equals 100,000 view-ops.

[0220]   With the enhanced embodiment the above example would be handled as follows:

[0221]   The first 1000 opportunities to display the advertisement are chosen using the technique described above in the standard embodiment. This is termed an initialization period and it is used to obtain some data upon which subsequent decisions can be based.

[0222]   When the 1001st view-op is encountered the system makes the following calculation:

[0223]   Each site where the advertisement was presented during the initialization period is evaluated to determine the number of "click-throughs" that resulted from the

advertisements displayed on that site. Next the number of "click-throughs" that would have resulted is calculated for each site based on the assumption that each opportunity to display on that site was taken. This gives a number which represents the "relative goodness" of each site.

[0224]   Let us assume that the goodness numbers are as follows:

For one hundred sites (called Sites A) the goodness is 10

For one hundred sites (called Sites B) the goodness is 8

For one hundred sites (called Sites C) the goodness is 5

For 200 sites the goodness is 1

[0225]   The selection criteria for sites A is set to 100 percent.

[0226]   The selection criteria for sites B is set to 80 percent.

[0227]   The selection criteria for sites C is set to 50 percent.

[0228]   The selection criteria for the remaining sites is set to 10 percent in order to continue gathering data from these sites for future calculations. The percentages of all sites is chosen so that at the present rate of view-ops, the total view-ops specified will be reached in the desired time period.

[0229]   The above calculation is re-made each time a new viewing opportunity is presented. Thus in the example given above the calculation is made approximately ninety nine thousand times. It should be noted that sites not used for advertisements as a result of the calculations made as described above are made available to the next lower bidder and that in the placement of advertisements on these sites, the process described above is repeated.

[0230]   It might seem that with the enhanced embodiment a great deal of calculating is made in order to determine which advertisement should be placed in response to a view-op. However, it should be considered that in practice advertisers pay up to a few cents for presenting particular advertisements on particular sites. With modern day computers the cost of making the type of calculations required by the enhanced embodiment are in the range of or less than mills (i.e. tenths of a cent) rather than cents.

[0231]   The enhanced embodiment optimizes the placement of advertisements, that is, advertisements are placed on sites where they are most effective. As described above, the optimization is based upon "click-through" rate. It is noted that the system could similarly optimize placement of advertisements based on a wide variety of other criteria. For example, instead of making the calculations based upon click-through rate, the calculations could be made based upon a measure of telephone inquiries made as a result of advertisements, or upon the number of sales that result directly related to an advertisement. Any measurable criteria specified by an advertiser could be used in place of the click through rate described above. It is also noted that as described above, the initial selection of what advertisement to place on a site is based upon bidding or auction system. It is noted that the effectiveness parameter could also be applied in situations where the initial selection criteria is something other than a bidding system. However, the initial selection is made as to which advertisement to place in response to a view-op, optimization could be achieved by calculating the relative goodness of placing advertisements on various sites as described herein and using this parameter in the selection process.

[0232]   In some circumstances, a system might not include enough computational power to make a calculation each time a view-op occurs. In such a system the calculations described herein could be made every other, every third, or on some other schedule. Naturally, limiting the frequency of the calculations would somewhat decrease the effectiveness of the system.

[0233]   Figures 7A and 7B are flow diagrams showing the operation of the present embodiment. Figure 7A shows the operation during the initialization period. This period continues until an advertisement is displayed 1000 times (or until an advertisement has been displayed for pre-specified percent of the total number of impressions desired). For the present embodiment it is assumed that each advertisement is scheduled for display at least ten thousand times. Thus the initialization period can extend up to ten percent of the times that an advertisement is displayed. It is however, noted that in practice, most Internet advertisements takes much less than ten percent of the total view-ops. The length of the initialization period is arbitrary, so long as it is long enough to give some valid data to use in the initial calculations.

[0234]   During the initialization period the results are achieved by each advertisement in form of "click-through" is evaluated. As previously explained, while the present embodiment utilizes "click-throughs" as a measure of the effectiveness of an advertisement in certain situations other measures could be used. For example, in a situation where an advertisement results in a request for literature, the number of requests for literature could be a measure. Other measures of the effectiveness of advertisement could also be devised.

[0235]   After the initialization period the process continues as shown in Figure 7B. The series of steps shown in Figure 7B is performed as each view-op that meets a bid's specification becomes available. The steps shown in Figures 7A and 7B will now be explained in detail.

[0236]   The steps shown in Figure 7A are performed during the initialization period. As indicated by blocks 701, 703 and 705, when a view-op becomes available, its properties are compared to the properties set out in the various bids, and the highest matching bid is selected. Next as indicated by block 707, a determination is made as to whether or not this view-op is needed to meet the schedule set out in the winning bid. If it is not needed, this view op is assigned to the next lower matching bid as indicated by block 709. If it is needed to meet the schedule, a check is made to determine if the initialization period is complete. If the initialization period is not complete, the advertisement is displayed as indicated by block 712. As indicated by block 315, if the initialization period is complete the process switches to the procedure shown in Figure 3B.

[0237]   Figure 7B shows the procedure that is followed after the initialization period. Steps 721, 723 and 725 are identical to the corresponding steps shown on Figure 7A and previously explained. Next as indicated by block 731, the system looks at the results achieved at each site where an advertisement was previously displayed and the results achieved are examined. In the simplest case this would be the number of "click-throughs" which resulted from the advertisement. That is, the number of times a viewer clicked on the advertisement in order to be linked to the advertiser's web site. The actual number of click-throughs is adjusted to take into account the fact that not each appropriate view-op was selected in step 707. For example, if:

(a)   the advertisement was displayed one hundred times on a particular site and five click throughs resulted,

(b)   only fifty percent of the view-ops had been selected for display of this advertisement (that is, only fifty percent of the view-ops were selected in previous steps 707 and 705).

then the relative goodness number would be ten for this site

[0238]   Block 733 indicates that the selection or scheduling criteria for each site is set based on the goodness numbers calculated in step 731. The percentage of view-ops scheduled for each site is scaled so that these values are in proportion to the "goodness" numbers and so that the total number of placements desired by the advertiser will be met if the situation were to remain stable at the present values. It must however be recognized that while at each point these numbers are established on the basis that the situation will remain stable, the values are calculated as each view-op occurs.

[0239]   Block 735 indicates that a determination is then made based on the new scheduling and selection criteria. If it is determined that this view-op should be taken, the advertisement is displayed as indicated in block 739. After the advertisement is displayed, the system waits for the next appropriate view-op and the procedure is repeated. If the determination in block 735 results in a decision that the view-op should not be taken, the view-op is assigned to the next lower bid and the procedure is repeated for that bid.

[0240]   The flow diagrams shown in Figure 7A and 7B can be programmed in any appropriate computer language. The particular language taken would be determined by the particular computer system being used. Fast personal computers and servers are available. Such server would normally be programmed using a language such as C++. The actual coding of the steps shown in Figures 7A and 7B is conventional.

[0241]   It should be noted that it is herein assumed that a viewer always accesses the World Wide Web using the same browser, so that the cookie in a browser accurately reflects what a viewer has done. It is also assumed that only one viewer uses a particular viewer browser, again so that the cookie in the browser accurately reflects what the particular viewer has done. Some inaccuracy in calculations naturally results since the above assumptions are

not always true. However, the resulting inaccuracy merely detracts from the overall efficiency of the advertising programs. Using the invention described herein nevertheless makes advertising more effective than it would be if the technique described herein nevertheless makes advertising more effective than it would be if the technique were not used.

[0242]   An alternative embodiment of the invention is shown in Figure 8. The system shown in Figure 8 is designed to minimize latency due to Internet topographical distance between units.

[0243]   The embodiment shown in Figure 8 is a geographically distributed system which includes three systems 816A, 816B and 816C each of which are identical to systems 16 shown in Figures 1 and 3. Each of the systems 816A, 816B, and 816C have associated bidding agents 830A, 830B and 830C. Each of the systems 816A, 816B and 816C is located a different geographic area.

[0244]   Client browser 811 sends web HTML references (such as those sent from browser 11 to web server 310) to a commercial Internet service provider (an ISP) 812. The ISP in turn sends an HTML reference to the system 816A, 816B or 816C which is "topographically" closest to the browser 811. For example, the three systems 816A, 816B and 816C could be located on different continents, one in the U.S., one in Europe and one in Japan. With the system shown in Figure 8, HTML references from browsers in Europe would be directed to the system in Europe, HTML references from browsers in the U.S. would be directed to the system in the U.S. etc. The bid input unit 818 sends each proposed bid to bidding agents 830 associated with each system. Thus, the systems 816A, 816B and 816C evaluate each proposed bid against the particular view-ops that are directed to each particular system. While for purposes of illustration, three systems 816A, 816B and 816C are shown, any number of such systems could be connected in an overall network of systems.

[0245]   While the invention has been shown and described with respect to preferred embodiments thereof, the scope of the applicant's invention is limited only by the appended claims. It should be understood that other embodiments of the invention are possible and that various changes in form and detail can be made without departing from the spirit and scope of the invention.

[0246]   Appended to this specification are a listing of claims, which include both independent claims and dependent claims. Each dependent claim refers to a previous claim, and should be construed to incorporate by reference all the limitations of the previous claim to which it refers. Further, each dependent claim of the present application should be construed and attributed meaning as having at least one additional limitation or element not present in the claim to which it refers. In other words, the claim to which each dependent claim refers is to be construed and attributed meaning as being broader than such dependent claim. In construing the meaning of the appended claims, full consideration should be given to the various remarks submitted to the United States Patent & Trademark Office in the course of prosecution of the appended claims.

ABSTRACT

A computer system and method for determining in response to each advertising opportunity of a plurality of advertising opportunities, which advertisement of a plurality of advertisements to provide for fulfilling the advertising opportunity. Each advertising opportunity is an opportunity to serve an advertisement to a browser in response to a request for content by the browser. Using bidding parameter supplied by advertisers to the computer system, bids are submitted in real-time for fulfilling the advertising opportunity. The computer system then selects a bid and identifies a corresponding advertisement for fulfilling the advertising opportunity.